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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
COLLINS, CYNTHIA E	
ART UNIT	**PAPER NUMBER**
1638	

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/737,476	FRENKEN ET AL.	
	Examiner	Art Unit	
	Cynthia Collins	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) *8 and 10-13* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

9.00

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed March 21, 2005 in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 3, 2005 has been entered.

Claim 1 is currently amended in Applicant's submission filed on February 3, 2005.

Claim 14 is cancelled in Applicant's submission filed on February 3, 2005.

Claim 1 is currently amended in Applicant's submission filed on March 21, 2005.

Claims 8 and 10-13 are withdrawn.

Claims 1-13 are pending.

Claims 1-7 and 9 are examined.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

All previous objections and rejections not set forth below have been withdrawn.

Claim Rejections - 35 USC § 102

Claims 1, 2, 7 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Casterman et al. I (WO 94/04678, 3 March 1994, Applicant's IDS), for the reasons of record.

Applicants' arguments filed February 3, 2005 and March 21, 2005 have been fully considered but they are not persuasive.

Applicants note that claim 1 was amended in the previous amendment filed February 3, 2005 to include the positive process steps of introducing and expressing a DNA sequence encoding the heavy chain antibody in addition to a peptide sequence that targets the antibody to a cellular compartment. Applicants also note that claim 1 was amended in the previous amendment above to clarify that the claimed method produces functional heavy chain antibodies. Applicants additionally maintain that they believe that the statement in claim 1 that the heavy chain antibody is devoid of a variable light chain domain makes it clear that the antibodies are heavy chain only antibodies and not merely heavy chain only antibodies at the point of production, especially when the claim is read in the context of the specification, which states on page 8, lines 26-29, that isolated VH domains of conventional antibodies are not included within the scope of the invention. Applicants also note that claim 1 was amended in the previous amendment to clarify that the antigen binding capacity of the heavy chain antibodies produced by the present invention resides in a single binding domain. As the above amendments appear to resolve the reasons provided by the Examiner for maintaining the rejection, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 USC 102(b) based on Casterman et al. (pages 6-8 of reply filed February 3, 2005; pages 9-10 of reply filed March 21, 2005)

As set forth at page 4 of the office action mailed October 21, 2004, claims 1, 2, 7, 9 and 14 were rejected under 35 U.S.C. 102(b) as being anticipated by Casterman et al. for reasons of record. The Examiner's comments set forth at pages 4-9 of the office action mailed October 21, 2004 were made in response to Applicants' arguments set forth in the reply filed August 5, 2004, and as such were not the sole reason for maintaining the rejection. Furthermore, the rejection is maintained as the method disclosed by Casterman et al. is identical to the claimed method.

Casterman et al. teach a method for modifying a plant to produce an antibody by introducing into a plant a DNA sequence encoding a heavy chain immunoglobulin obtainable from camelids (page 33 first paragraph). The heavy chain immunoglobulins obtainable from camelids are heavy chain only antibodies, devoid of a variable light chain domain, with their antigen binding capacity residing in a single binding domain. Casterman et al. also teach the use of a sequence which expresses a peptide which targets an antibody to a cellular compartment, given their explicit reference on page 33 to the method taught by Hiatt et al. (Nature Vol. 342 pages 76-79, 1989), who used a leader sequence which encodes a peptide that targets antibody to the endoplasmic reticulum (page 76 column 2 first full paragraph after the abstract).

Claims 1, 2, 5, 7 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Casterman et al. II (US Patent No. 5,759,808, issued June 2, 1998).

The claims are drawn to a method for producing in a cellular compartment in a plant a functional heavy chain antibody or an active fragment of heavy chain antibody obtainable from camelids showing the antigen binding activity of the antibody, comprising introducing into said plant a DNA sequence which encodes an antibody that is a heavy chain immunoglobulin devoid of a variable light chain domain, or an active fragment of said immunoglobulin devoid of a variable light chain domain, wherein antigen-binding capacity is located in a single binding domain and binds to a plant or animal pathogen, and expressing said antibody or said active fragment, said DNA sequence also including a sequence which expresses a peptide which targets said antibody or fragment thereof to said cellular compartment. The claims are also drawn to a plant prepared by said method.

Casterman et al. II teach a method for producing camelid antibodies in a plant by introducing into a plant a DNA sequence encoding a camelid antibody (column 15 lines 42-47; column 16 lines 12-18; column 17 lines 64-67; column 18 lines 52-60; column 112 claim 8). The heavy chain immunoglobulins obtainable from camelids are heavy chain only antibodies, devoid of a variable light chain domain, with their antigen binding capacity residing in a single binding domain. Casterman et al. also teach the use of a sequence which expresses a peptide which targets an antibody to a cellular compartment, given their explicit reference at column 18 lines 52-60 to the method taught by Hiatt et al. (Nature Vol. 342 pages 76-79, 1989), who used a leader sequence which encodes a peptide that targets antibody to the endoplasmic reticulum (page 76 column 2 first full paragraph after the abstract). Casterman et al. II also teach a method for producing camelid antibodies in a plant wherein the camelid antibodies bind to insect gut antigen, said insect being an animal pathogen in that it is a pathogen that is an animal, and a plant pathogen in that it is a pathogen of plants (column 16 lines 12-18).

Claim Rejections - 35 USC § 103

Claims 1, 3, 4, 7 and 9 are rejected, under 35 U.S.C. 103(a) as being unpatentable over any of Magnuson et al. (Protein Expression and Purification, 1996, Vol. 7, pages 220-228) or Casterman et al. I (WO 94/04678, 3 March 1994, Applicant's IDS) or Casterman et al. II (US Patent No. 5,759,808, issued June 2, 1998), in view of Owen et al. (Biotechnology, Vol. 10, pages 790-794, July 1992), for reasons of record.

Applicants' arguments filed February 3, 2005 and March 21, 2005 have been fully considered but they are not persuasive.

Applicants maintain that according to the Office Action, the rejection remains because the claims recite no method steps directed to the production of antibodies in compartments of a real plant, and in this regard Applicants note that claim 4 is dependent on claim 1, which has been amended to clarify that the antibodies of the present invention are produced in a cellular compartment in a plant. Reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) based on Magnuson et al. or Casterman et al. in view of Owen et al. is respectfully requested. (page 8 of reply filed February 3, 2005; page 11 of reply filed March 21, 2005)

As set forth at page 9 of the office action mailed October 21, 2004, claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over either of Magnuson et al. or Casterman et al. I in view of Owen et al. for reasons of record. The Examiner's comments set forth at pages 9-11 of the office action mailed October 21, 2004 were made in response to Applicants' arguments set forth in the reply filed August 5, 2004, and as such were not the sole reason for maintaining the rejection. Furthermore, the rejection is maintained as the claimed methods are obvious in view of the teachings of any of Magnuson et al. or Casterman et al. I or Casterman et al. II in view of Owen et al.

Magnuson et al. teach a method for modifying a plant to produce an antibody comprising introducing into tobacco suspension culture cells a DNA sequence encoding a heavy chain immunoglobulin devoid of a variable light chain domain and obtained from a 93G7 monoclonal antibody, said sequence being operably linked to a CaMV 35S promoter, and expressing the antibody which is devoid of light chain domains but capable of specific binding with an antigen, in the cytoplasm and plasma membrane (page 222 Figure 1; page 223 Table 1 and Figures 2-3; page 224 Figures 4-5; page 225 Table 2; page 226 Figure 9). The DNA sequence taught by

Magnuson et al. further comprises an additional sequence encoding a native leader peptide sequence capable of targeting said antibody to the cytoplasm and plasma membrane (page 224 column 1 first paragraph).

Casterman et al. I teach a method for modifying a plant to produce an antibody by introducing into a plant a DNA sequence encoding a heavy chain immunoglobulin obtainable from camelids (page 33 first paragraph). The heavy chain immunoglobulins obtainable from camelids are heavy chain only antibodies, devoid of a variable light chain domain, with their antigen binding capacity residing in a single binding domain. Casterman et al. I also teach the use of a sequence which expresses a peptide which targets an antibody to a cellular compartment, given their explicit reference on page 33 to the method taught by Hiatt et al. (Nature Vol. 342 pages 76-79, 1989), who used a leader sequence which encodes a peptide that targets antibody to the endoplasmic reticulum (page 76 column 2 first full paragraph after the abstract).

Casterman et al. II teach a method for producing camelid antibodies in a plant by introducing into a plant a DNA sequence encoding a camelid antibody (column 15 lines 42-47; column 16 lines 12-18; column 17 lines 64-67; column 18 lines 52-60; column 112 claim 8). The heavy chain immunoglobulins obtainable from camelids are heavy chain only antibodies, devoid of a variable light chain domain, with their antigen binding capacity residing in a single binding domain. Casterman et al. also teach the use of a sequence which expresses a peptide which targets an antibody to a cellular compartment, given their explicit reference at column 18 lines 52-60 to the method taught by Hiatt et al. (Nature Vol. 342 pages 76-79, 1989), who used a leader sequence which encodes a peptide that targets antibody to the endoplasmic reticulum (page 76 column 2 first full paragraph after the abstract).

Magnuson et al. do not teach the use of whole plants expressing antibodies.

Neither Magnuson et al. nor Casterman et al. I or II teach the expression in plants of a DNA sequence encoding a heavy chain immunoglobulin devoid of a variable light chain domain but capable of specific binding with an antigen that is a protein present in a plant.

Owen et al. teach the expression in plants of a DNA sequence encoding a single-chain Fv recombinant immunoglobulin capable of specific binding with an antigen that is a phytochrome protein present in a plant, as set forth previously in the rejection of claims 1, 3, 4, 7 and 9 under 35 USC 102 at pages 8-9 of the Office action mailed September 10, 2002.

Given the success of Magnuson et al. in expressing in a plant cell a DNA sequence encoding a heavy chain immunoglobulin devoid of a variable light chain domain but capable of specific binding with an antigen or the teaching of Casterman et al. I and II to do the same in a plant, and given the success of Owen et al. in expressing in a plant a DNA sequence encoding a single-chain Fv recombinant immunoglobulin capable of specific binding with an antigen that is a phytochrome protein present in a plant, it would have been *prima facie* obvious to one skilled in the art at the time the invention was made to express in a plant any type of immunoglobulin capable of specific binding with an antigen that is a protein present in a plant, including a heavy chain immunoglobulin devoid of a variable light chain domain, for the purpose of manipulating a plant's physiologic responses, without any surprising or unexplained results. Accordingly, one skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success. Thus, the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time the invention was made, especially in the absence of evidence to the contrary.

Claims 1, 3, 5, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of Magnuson et al. (Protein Expression and Purification, 1996, Vol. 7, pages 220-228) or Casterman et al. I (WO 94/04678, 3 March 1994, Applicant's IDS) or Casterman et al. II (US Patent No. 5,759,808, issued June 2, 1998), in view of Le Gall et al. (Applied and Environmental Microbiology, Vol. 64, No. 11, pages 4566-4572, November 1998), for the reasons of record.

Applicants' arguments filed February 3, 2005 and March 21, 2005 have been fully considered but they are not persuasive.

Applicants maintain that according to the Office Action, the rejection remains because the claims recite no method steps directed to the production of antibodies in compartments of a real plant, and in this regard Applicants note that claim 5 is dependent on claim 1, which has been amended to clarify that the antibodies of the present invention are produced in a cellular compartment in a plant. Reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) based on Magnuson et al. or Casterman et al. in view of Le Gall et al. is respectfully requested. (pages 8-9 of reply filed February 3, 2005; page 11 of reply filed March 21, 2005)

As set forth at page 11 of the office action mailed October 21, 2004, claim 5 was rejected under 35 U.S.C. 103(a) as being unpatentable over either of Magnuson et al. or Casterman et al. I in view of Le Gall et al. for reasons of record. The Examiner's comments set forth at pages 12-13 of the office action mailed October 21, 2004 were made in response to Applicants' arguments set forth in the reply filed August 5, 2004, and as such were not the sole reason for maintaining the rejection. Furthermore, the rejection is maintained as the claimed methods are obvious in view of the teachings of either of Magnuson et al. or Casterman et al. I or Casterman et al. II in view of Le Gall et al.

Magnuson et al. teach a method for modifying a plant to produce an antibody comprising introducing into tobacco suspension culture cells a DNA sequence encoding a heavy chain immunoglobulin devoid of a variable light chain domain and obtained from a 93G7 monoclonal antibody, said sequence being operably linked to a CaMV 35S promoter, and expressing the antibody which is devoid of light chain domains but capable of specific binding with an antigen, in the cytoplasm and plasma membrane (page 222 Figure 1; page 223 Table 1 and Figures 2-3; page 224 Figures 4-5; page 225 Table 2; page 226 Figure 9). The DNA sequence taught by Magnuson et al. further comprises an additional sequence encoding a native leader peptide sequence capable of targeting said antibody to the cytoplasm and plasma membrane (page 224 column 1 first paragraph).

Casterman et al. I teach a method for modifying a plant to produce an antibody by introducing into a plant a DNA sequence encoding a heavy chain immunoglobulin obtainable from camelids (page 33 first paragraph). The heavy chain immunoglobulins obtainable from camelids are heavy chain only antibodies, devoid of a variable light chain domain, with their antigen binding capacity residing in a single binding domain. Casterman et al. I also teach the use of a sequence which expresses a peptide which targets an antibody to a cellular compartment, given their explicit reference on page 33 to the method taught by Hiatt et al. (Nature Vol. 342 pages 76-79, 1989), who used a leader sequence which encodes a peptide that targets antibody to the endoplasmic reticulum (page 76 column 2 first full paragraph after the abstract).

Casterman et al. II teach a method for producing camelid antibodies in a plant by introducing into a plant a DNA sequence encoding a camelid antibody (column 15 lines 42-47; column 16 lines 12-18; column 17 lines 64-67; column 18 lines 52-60; column 112 claim 8). The

heavy chain immunoglobulins obtainable from camelids are heavy chain only antibodies, devoid of a variable light chain domain, with their antigen binding capacity residing in a single binding domain. Casterman et al. also teach the use of a sequence which expresses a peptide which targets an antibody to a cellular compartment, given their explicit reference at column 18 lines 52-60 to the method taught by Hiatt et al. (Nature Vol. 342 pages 76-79, 1989), who used a leader sequence which encodes a peptide that targets antibody to the endoplasmic reticulum (page 76 column 2 first full paragraph after the abstract). Casterman et al. II also teach a method for producing camelid antibodies in a plant wherein the camelid antibodies bind to insect gut antigen, said insect being an animal pathogen in that it is a pathogen that is an animal, and a plant pathogen in that it is a pathogen of plants (column 16 lines 12-18).

Magnuson et al. do not teach the use of whole plants expressing antibodies.

Neither Magnuson et al. nor Casterman et al. I teach the expression in plants of a DNA sequence encoding a heavy chain immunoglobulin devoid of a variable light chain domain but capable of specific binding with an antigen that is a plant or animal pathogen.

Le Gall et al. teach the expression in plants of a DNA sequence encoding a single-chain Fv recombinant immunoglobulin capable of specific binding with an antigen that is a stolbur phytoplasma plant pathogen, as set forth previously in the rejection of claims 1, 3, 4, 5 and 7 under 35 USC 102 at pages 10-11 of the Office action mailed September 10, 2002.

Given the success of Magnuson et al. in expressing in a plant cell a DNA sequence encoding a heavy chain immunoglobulin devoid of a variable light chain domain but capable of specific binding with an antigen or the teaching of Casterman et al. I and II to do the same in a plant, and given the success of Le Gall et al. in expressing in a plant a DNA sequence encoding a

single-chain Fv recombinant immunoglobulin capable of specific binding with an antigen that is a stolbur phytoplasma plant pathogen, it would have been *prima facie* obvious to one skilled in the art at the time the invention was made to express in a plant any type of immunoglobulin capable of specific binding with an antigen that is a plant pathogen, including a heavy chain immunoglobulin devoid of a variable light chain domain, for the purpose of improving a plant's resistance to infection by a plant pathogen, without any surprising or unexplained results. Accordingly, one skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success. Thus, the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time the invention was made, especially in the absence of evidence to the contrary.

Claims 1, 3, 6, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of Magnuson et al. (Protein Expression and Purification, 1996, Vol. 7, pages 220-228) or Casterman et al. I (WO 94/04678, 3 March 1994, Applicant's IDS) or Casterman et al. II (US Patent No. 5,759,808, issued June 2, 1998), in view of Artsaenko et al. (The Plant Journal, Vol. 8, No. 5, pages 745-750, 1995), for reasons of record.

Applicants' arguments filed February 3, 2005 and March 21, 2005 have been fully considered but they are not persuasive.

Applicants maintain that according to the Office Action, the rejection remains because the claims recite no method steps directed to the production of antibodies in compartments of a real plant, and in this regard Applicants note that claim 6 is dependent on claim 1, which has been amended to clarify that the antibodies of the present invention are produced in a cellular

compartment in a plant. Reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) based on Magnuson et al. or Casterman et al. in view of Artsaenko et al. is respectfully requested. (page 9 of reply filed February 3, 2005; pages 11-12 of reply filed March 21, 2005)

As set forth at page 13 of the office action mailed October 21, 2004, claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over either of Magnuson et al. or Casterman et al. I in view of Artsaenko et al. for reasons of record. The Examiner's comments set forth at pages 13-14 of the office action mailed October 21, 2004 were made in response to Applicants' arguments set forth in the reply filed August 5, 2004, and as such were not the sole reason for maintaining the rejection. Furthermore, the rejection is maintained as the claimed methods are obvious in view of the teachings of any of Magnuson et al. or Casterman et al. I or Casterman et al. II in view of Artsaenko et al.

Magnuson et al. teach a method for modifying a plant to produce an antibody comprising introducing into tobacco suspension culture cells a DNA sequence encoding a heavy chain immunoglobulin devoid of a variable light chain domain and obtained from a 93G7 monoclonal antibody, said sequence being operably linked to a CaMV 35S promoter, and expressing the antibody which is devoid of light chain domains but capable of specific binding with an antigen, in the cytoplasm and plasma membrane (page 222 Figure 1; page 223 Table 1 and Figures 2-3; page 224 Figures 4-5; page 225 Table 2; page 226 Figure 9). The DNA sequence taught by Magnuson et al. further comprises an additional sequence encoding a native leader peptide sequence capable of targeting said antibody to the cytoplasm and plasma membrane (page 224 column 1 first paragraph).

Casterman et al. I teach a method for modifying a plant to produce an antibody by introducing into a plant a DNA sequence encoding a heavy chain immunoglobulin obtainable from camelids (page 33 first paragraph). The heavy chain immunoglobulins obtainable from camelids are heavy chain only antibodies, devoid of a variable light chain domain, with their antigen binding capacity residing in a single binding domain. Casterman et al. I also teach the use of a sequence which expresses a peptide which targets an antibody to a cellular compartment, given their explicit reference on page 33 to the method taught by Hiatt et al. (Nature Vol. 342 pages 76-79, 1989), who used a leader sequence which encodes a peptide that targets antibody to the endoplasmic reticulum (page 76 column 2 first full paragraph after the abstract).

Casterman et al. II teach a method for producing camelid antibodies in a plant by introducing into a plant a DNA sequence encoding a camelid antibody (column 15 lines 42-47; column 16 lines 12-18; column 17 lines 64-67; column 18 lines 52-60; column 112 claim 8). The heavy chain immunoglobulins obtainable from camelids are heavy chain only antibodies, devoid of a variable light chain domain, with their antigen binding capacity residing in a single binding domain. Casterman et al. also teach the use of a sequence which expresses a peptide which targets an antibody to a cellular compartment, given their explicit reference at column 18 lines 52-60 to the method taught by Hiatt et al. (Nature Vol. 342 pages 76-79, 1989), who used a leader sequence which encodes a peptide that targets antibody to the endoplasmic reticulum (page 76 column 2 first full paragraph after the abstract).

Magnuson et al. do not teach the use of whole plants expressing antibodies.

Neither Magnuson et al. nor Casterman et al. I or II teach the expression in plants of a DNA sequence encoding a heavy chain immunoglobulin devoid of a variable light chain domain but capable of specific binding with an antigen that is a plant hormone or metabolite.

Artsaenko et al. teach the expression in plants of a DNA sequence encoding a single-chain Fv recombinant immunoglobulin capable of specific binding with an antigen that is an abscisic acid plant hormone, as set forth previously in the rejection of claims 1, 3 and 6-7 under 35 USC 102 at pages 9-10 of the Office action mailed September 10, 2002.

Given the success of Magnuson et al. in expressing in a plant cell a DNA sequence encoding a heavy chain immunoglobulin devoid of a variable light chain domain but capable of specific binding with an antigen or the teaching of Casterman et al. I and II to do the same in plants, and given the success of Artsaenko et al. in expressing in a plant a DNA sequence encoding a single-chain Fv recombinant immunoglobulin capable of specific binding with an antigen that is an abscisic acid plant hormone, it would have been *prima facie* obvious to one skilled in the art at the time the invention was made to express in a plant any type of immunoglobulin capable of specific binding with an antigen that is a plant hormone, including a heavy chain immunoglobulin devoid of a variable light chain domain, for the purpose of manipulating a plant's physiologic responses, without any surprising or unexplained results. Accordingly, one skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success. Thus, the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time the invention was made, especially in the absence of evidence to the contrary.

Remarks

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Collins whose telephone number is (571) 272-0794. The examiner can normally be reached on Monday-Friday 8:45 AM -5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson can be reached on (571) 272-0804. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Cynthia Collins
Examiner
Art Unit 1638

CC

Cynthia Collins
6/21/05